

CLAIMS

I claim:

- [c1] 1. A seat belt system adapted for use with a seat having a seat-belt ready seat frame of the type having a substantially vertical, rectangular back seat frame formed by rigidly joined top, side, and bottom bar portions, a substantially horizontal, rectangular bottom seat frame formed by rigidly joined front, rear, and side bar portions and joined to said back seat frame, a seat back cushion removably attached to said back seat frame and a seat bottom cushion removably attached to said bottom seat frame, without further modification to said seat frame; said seat belt system comprising:
- a) a retractor and belt housing unit comprising:
 - i) an enclosure portion;
 - ii) a lid portion fixedly attached to said enclosure portion;
 - iii) a seat belt retractor contained within said enclosure and lid portions and fixedly attached to said enclosure portion comprising:
 - 1) a seat belt retractor mechanism; and
 - 2) a retractor belt having a first section of webbing bounded by front and back sides mounted on said retractor mechanism and having at a distal end thereof a first seat belt connector;
 - iv) a back cover portion, fixedly attached to said seat frame and removably attached to said housing unit and covering said back side of said retractor seat belt extending from said housing unit; said back cover portion in conjunction with said enclosure and lid portions forming an aperture for passage of said retractor seat belt such that said aperture permits said seat belt to be withdrawn and retracted by use of said retractor mechanism through said aperture; and
 - v) means for fixedly attaching said housing unit to the underside of said seat frame;
 - b) a multi-connecting lap and shoulder belt having a second section of seat belt webbing fixedly attached at one end to said seat frame, and connected at a distal end by

means in a Y-junction configuration to second and third seat belt connectors, wherein said second connector releasably interconnects with said first connector; and

c) a single lap belt having a third section of seat belt webbing fixedly attached at one end to said seat frame and connected at the opposite distal end to a fourth seat belt connector releasably interconnected with said third connector.

[c2] 2. The seat belt system of claim 1, wherein said means for fixedly attaching said housing unit to the underside of said seat frame comprises bolts bolting said housing unit to said seat frame at one end and straps strapping said housing unit to said seat frame at an opposite end.

[c3] 3. The seat belt system of claim 1, wherein said housing unit is secured below, and extends between said front and rear bar portions of said bottom seat frame.

[c4] 4. The seat belt system of claim 3, wherein said housing unit is secured by a bolt to the underside of said rear bar portion of said bottom seat frame and by straps to the front bar portions of said bottom seat frame.

[c5] 5. The seat belt system in claim 1, wherein the path of said retractor seat belt includes an opening through said seat back cushion.

[c6] 6. The seat belt system of claim 1, wherein said first connector is a tongue connector.

[c7] 7. The seat belt system of claim 1, wherein said first connector is a clasp connector.

[c8] 8. The seat belt system of claim 6, wherein said second section of seat belt webbing has means for adjusting the length of said second section of webbing, said second connector comprises a buckle, and said third connector comprises a tongue connector.

- [c9] 9. The seat belt system of claim 7, wherein said second section of seat belt webbing includes means for adjusting the length of said second section of webbing, said second connector comprises a post connector, and said third connector comprises a tongue connector.
- [c10] 10. The seat belt system of claim 8, wherein said fourth seat belt connector comprises a buckle.
- [c11] 11. The seat belt system of claim 9, wherein said fourth seat belt connector comprises a buckle.
- [c12] 12. The seat belt system of claim 6, wherein said second and third connectors comprise buckles and said fourth connector comprises a tongue connector.
- [c13] 13. The seat belt system of claim 1, wherein said fourth connector comprises a tongue connector, and said third section of seat belt webbing comprises means for adjusting the length of said third section of webbing.
- [c14] 14. The seat belt system of claim 1, wherein said housing unit comprises:
- a) a three dimensional triangular bottom portion comprising:
 - i) a rectangular sheet of metal, with top and bottom sides and two lateral sides, bent at about a ninety degree angle wherein the bend is perpendicular to the two lateral sides and divides the length into top and bottom portions, both portions with a top half and a bottom half, and wherein an opening for a stud is provided for at the bottom half of the top portion;
 - ii) a first triangular sheet of metal attached at approximately a ninety degree angle to the first lateral side of said rectangular sheet at both the top and bottom portions, and wherein a plurality of openings are provided for at the distal end opposite the attachment to said first triangular sheet; and

- iii) a second triangular sheet of metal attached at approximately a ninety degree angle to the second lateral side of the rectangular sheet at both the top and bottom portions, and wherein a plurality of openings are provided for at the distal end opposite the attachment to said second triangular sheet;
- b) a second rectangular sheet of metal, with top and bottom ends and two lateral sides, having an extension at the top end upwardly bent at approximately a forty-five degree angle, and having both lateral sides bent downwards at about a ninety degree angle, and tapered inward at both top and bottom ends such that said second rectangular sheet fits over top of and encloses said three-dimensional triangular bottom portion, and wherein both bent lateral sides contain a plurality of openings for fixedly attaching said second rectangular sheet to said three-dimensional bottom portion; and
- c) a seat belt retractor mounted within said housing unit.

[c15] 15. The housing unit of claim 14, wherein said metal sheets are composed of steel.

[c16] 16. The seat belt system of claim 1, wherein said system is adapted for a plurality of occupants, each of which is provided with said seat belt system.

[c17] 17. A seat belt system adapted for use with a seat structure having: (i) a substantially vertical, rectangular back frame formed by rigidly joined top, side, and bottom bar portions; (ii) a substantially horizontal, rectangular bottom seat frame formed by front, rear, and side bar portions; (iii) a back cushion covering and secured to said back frame; and (iv) a bottom cushion covering and secured to said bottom seat frame;

said seat belt system comprising:

- a) a seat belt and belt retracting storage container having: (i) a base secured to, and below selected bar portions of said bottom seat frame; and (ii) a wall structure joined to said base, forming said container and extending downwardly below said base;
- b) a belt retracting mechanism stored in said container and mounting an extendable length of shoulder belt having a chest portion which can be withdrawn and retracted by

use of said mechanism, said shoulder belt being arranged to pass through and be guided by: (i) a lower aperture surrounded by portions of said base and wall structure located rearwardly of said bottom seat frame rear bar portion; and (ii) by an upper aperture formed in and passing through an upper portion of said back cushion;

- c) a shoulder belt connector mounted on a distal end of said shoulder belt;
- d) a lap belt made up of first and second sections, at least one of which is extendable: (i) said first section being secured at one end to said bottom seat frame and at an opposite distal end having a lap belt connector mounted thereon; and (ii) said second section being secured at one end to said bottom seat frame at a location inwardly of where said first section is secured and at an opposite distal end mounting another lap belt connector thereon, said lap belt connectors being formed such that through interconnection of said lap belt connectors, said first and second sections are enabled to be releasably joined;
- e) a lap-shoulder belt connector mounted on and intermediate the length of said lap belt first section, and formed such that through interconnection of said shoulder belt and lap-shoulder belt connectors, said distal end of said shoulder belt is enabled to be releasably joined to an intermediate portion of said lap belt; and
- f) wherein said seat structure, back, and bottom seat frames are adapted for immediate use with said seat belt system.

[c18] 18. A seat belt system, as claimed in claim 17, wherein said seat belt system is adapted for a plurality of occupants, each of which is provided with said seat-belt system.

[c19] 19. A seat belt system, as claimed in claim 17, wherein selected of said connectors comprise a slot type connector, and others of said connectors comprise a mating stud-type connector adapted to be received by said slot-type connector.

[c20] 20. A seat belt system, as claimed in claim 17, including a belt guide plate mounted on a trailing portion of said container wall.

[c21] 21. A seat belt system, as claimed in claim 17, wherein said belt retracting mechanism includes a retractor housing secured to said container wall structure.

[c22] 22. A seat belt system adapted for use with a seat structure having: (i) a substantially vertical, rectangular back frame formed by rigidly joined top, side, and bottom bar portions; (ii) a substantially horizontal, rectangular bottom seat frame formed by front, rear, and side bar portions; (iii) a back cushion covering and secured to said back frame; and (iv) a bottom cushion covering and secured to said bottom seat frame;

said seat belt system comprising:

- a) a seat belt and belt retracting storage container having: (i) a base secured to, below, and extending between said front and rear bar portions of said bottom seat frame; and (ii) a wall structure joined to said base, forming said container and extending downwardly below said base;
- b) a belt retracting mechanism stored in said container and mounting an extendable length of shoulder belt having a chest portion which can be withdrawn and retracted by use of said mechanism, said shoulder belt being arranged to pass through and be guided by: (i) a lower aperture surrounded by portions of said container base and wall structure and located rearwardly of said bottom seat frame rear bar portion; and (ii) by an upper aperture formed in and passing through an upper portion of said back cushion;
- c) a shoulder belt male connector mounted on a distal end of said shoulder belt;
- d) a lap belt made up of first and second sections, at least one of which is extendable: (i) said first section being secured at one end to said bottom seat frame and at an opposite distal end having a lap belt male connector mounted thereon; and (ii) said second section being secured at one end to said bottom seat frame at a location inwardly of where said first section is secured and at an opposite distal end mounting another lap belt female connector thereon, said lap belt connectors being formed such that by interconnection of said lap belt male connector to said lap belt female connector, said first and second sections are enabled to be releasably joined;

- e) a lap-shoulder belt female connector mounted on and intermediate the length of said lap belt first section, whereby, by interconnection of said shoulder belt male connector and said lap-shoulder belt female connector, said distal end of said shoulder belt is enabled to be releasably joined to an intermediate portion of said lap belt; and
- f) wherein said seat structure, back, and bottom seat frames are adapted for immediate use with said seat belt system.

[c23] 23. A seat belt system, as claimed in claim 22, wherein said seat belt system is adapted for a plurality of occupants, each of which is provided with said seat-belt system.

[c24] 24. A three-point seat belt system wherein said system comprises:

- a) a retractor shoulder belt with a single first connector on its distal end;
- b) a multi-connecting lap and shoulder belt comprising:
 - i) seat belt webbing connected to a Y-junction;
 - ii) a second connector attached to one end of the Y-junction, which releasably attaches to said first connector; and
 - iii) a third connector attached to the second end of the Y-junction; and
- c) a single lap belt with a fourth connector on its distal end, which releasably attaches to said third connector.

[c25] 25. The seat belt system of claim 24, wherein said first and third connectors are tongue connectors, and said third and fourth connectors are buckles.

[c26] 26. The seat belt system of claim 24, wherein said first connector is a clasp connector, said second connector is a post connector, said third connector is a tongue connector, and said fourth connector is a buckle.

[c27] 27. The seat belt system of claim 24, wherein said first and fourth connectors are tongue connectors, and said third and fourth connectors are buckles.